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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/598,169	06/21/2000	Kenji Toyosawa	1035-270	6952

7590 03/18/2003

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EXAMINER	
VU, HUNG K	
ART UNIT	PAPER NUMBER
2811	

DATE MAILED: 03/18/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Offic Action Summary	Application No. 09/598,169	Applicant(s) TOYOSAWA ET AL.	
	Examiner Hung K. Vu	Art Unit 2811	

-- Th MAILING DATE f this communication appears on the cov r she t with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 February 2002 and 06 February 2002* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *14-16,22,25-27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *14-16,22 and 25-27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☒ The proposed drawing correction filed on *21 June 2000* is: a)☒ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *8* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Claim Objections

1. Claims 16 and 26-27 are objected to because of the following informalities: In claims 16 and 26-27, line 1, "A" should be changed to "The" for clarity. Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claims 14, 15, 22 and 25-26 are rejected under 35 U.S.C. 102(a) as being anticipated by Ng (PN 5,843,839, of record).

Ng discloses, as shown in Figure 12, a semiconductor device comprising,

an active element (3,4,5,6,7) provided on a semiconductor substrate (1), the active element including at least two diffusion layers (5,7) and a gate electrode (4) [Figure 1, Col. 4, lines 3-31];

a metal wiring layer (12b,17b) provided on the active element;

an interlayer insulating film (18,23) covering the active element;

a pad metal (24) for an electrode pad, the pad metal on the interlayer insulating film;

a barrier metal layer (41) provided on the active element with the interlayer insulating film therebetween, so that the pad metal is provided on the barrier metal layer and covering the active element, wherein:

the interlayer insulating film has at least a level difference compensating film for compensating a level difference of the metal wiring layer;

a portion of the level difference compensating film under the pad metal is removed.

With regard to claim 15, Ng discloses the level difference compensating film is formed to a minimum thickness necessary for compensating the level difference of the metal wire [Figure 12].

With regard to claim 22, Ng discloses, as shown in Figure 12, a semiconductor device comprising,

an active element (3,4,5,6,7) provided on a semiconductor substrate (1), the active element including at least two diffusion layers (5,7) and a gate electrode (4) [Figure 1, Col. 4, lines 3-31];

a lower interlayer insulating film (14,15,16) formed so as to cover the active element;

a metal wiring layer (17b) provided on the lower interlayer insulating film;

an upper interlayer insulating film (18) formed so as to cover the metal wiring layer;

a pad metal (24) for an electrode pad, the pad metal being provided on the upper interlayer insulating film and covering the active element,

another metal wiring layer (12b) layer formed on the active element;

wherein each of the lower and upper interlayer insulating films have a trilaminar structure, each of a first layer (14,lower portion 18) and a third layer (16,upper portion of 18) of the trilaminar film being a silicon nitride film or a silicon oxide film, while a second layer (15,middle portion of 18) of the trilaminar film being formed of spin-on-glass [Figures 7-12, Col. 5, lines 30-56, Col. 6, lines 25-29, and Col. 6, line 65 – Col. 7, line 3];

and the second layer of the upper interlayer insulating film formed to a minimum thickness necessary for compensating the level difference of the metal wiring layer.

With regard to claim 25, Ng discloses, as shown in Figure 12, a semiconductor device comprising,

an active element (3,4,5,6,7) provided on a semiconductor substrate (1), the active element including at least two diffusion layers (5,7) and a gate electrode (4) [Figure 1, Col. 4, lines 3-31];

a first metal wiring layer (17b) formed on the active element;

a plurality of other metal wiring layers (12b,12c,17c,22) above the active element;

a plurality of interlayer insulating films (14,15,16,18,23) each being provided between a pair of metal wiring layers [],

wherein each interlayer insulating film has a multilayer structure including at least a spin-on-glass film (15,middle portion of 18, and middle portion of 23) sandwiched between insulating films (14,16,lower and upper portion of 18, and lower and upper portion of 23) formed of a silicon nitride film or a silicon oxide film [Figures 7-12, Col. 5, lines 30-56, Col. 6, lines 25-29, and Col. 6, line 65 – Col. 7, line 3];

further wherein the film formed of spin-on-glass in the interlayer insulating film being formed to a minimum thickness necessary for compensating a level difference of one of the metal wiring layers [Figure 12];

a pad metal (24) for an electrode pad, the pad metal being provided on the interlayer insulating film

With regard to claim 26, Ng discloses the pad metal (24) covers the active element [Figure 12].

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 16 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ng (PN 5,843,839, of record) in view of Hosomi et al. (PN 5,773,888).

With regard to claim 16, Ng taught the invention substantially as claimed, including the semiconductor device as recited in the rejection of claim 14. Ng does not teach a passivation film being covering a large part of the pad metal and an aperture in the passivation film having an edge adjacent an inside edge of the pad metal. However, Hosomi et al. taught a semiconductor device comprising a passivation film (3) being covering a large part of the pad metal (2) and an aperture (9) in the passivation film having an edge adjacent an inside edge of the pad metal [Figure 1 and Col. 4, lines 42-67]. Therefore, it would have been obvious to one

of ordinary skill in the art at the time the invention was made to form the device of Ng having a passivation film being covering a large part of the pad metal and an aperture in the passivation film having an edge adjacent an inside edge of the pad metal, such as taught by Hosomi et al. in order to protect the device from external contamination.

With regard to claim 16, Ng and Hosomi et al. taught the device further comprising another barrier metal layer (4) providing on the passivation film and the pad metal which is exposed by a window in the passivation film [Figure 1 and Col. 5, lines 1-15].

Response to Arguments

4. Applicant's arguments filed 02/04/02 have been fully considered but they are not persuasive.

It is argued, at page 7 of the Remarks, that the pad metal does not substantially cover the two diffusion layers and the gate electrode of the active element. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., substantially cover the two diffusion layers and the gate electrode of the active element) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

It is argued, at page 7 of the Remarks, that Ng does not disclose multiple interlayer insulating film between wire layers as recited in claim 25. This argument is not convincing

because Ng discloses, as shown in Figure 12, multiple interlayer insulating film (14,15,16,18, and 23) between wire layers (12b,17b,22 and 12c,17c,22)

It is argued, at page 7 of the Remarks, that Ng does not disclose a metal pad over a barrier layer or interlayer insulating film. This argument is not convincing because Ng discloses, as shown in Figure 12, a metal pad (24) over a barrier layer (41) or interlayer insulating film (8).

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hung K. Vu whose telephone number is (703) 308-4079. The

examiner can normally be reached on Mon-Thurs 7:00-4:30 and every other Friday 7:00-3:30, Eastern Time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (703) 308-2772. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Vu

March 11, 2003

Tom Thomas

TOM THOMAS
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800